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First record of *Stenochrus portoricensis* Chamberlin, 1922 (Arachnida: Schizomida: Hubbardiidae) for caves in Brazil: evidence for a troglophile status of an exotic species

Jonas E. Gallão[1, 2*], **Maria E. Bichuette**[1] and **Alessandro P. L. Giupponi**[3]

1 Laboratório de Estudos Subterrâneos, Departamento de Ecologia e Biologia Evolutiva, Universidade Federal de São Carlos, Via Washington Luiz, km 235, PO Box 676, 13565-905, São Carlos, SP, Brazil
2 Programa de Pós-Graduação em Biologia Comparada, Faculdade de Filosofia Ciências e Letras de Ribeirão Preto, Universidade de São Paulo
3 Laboratório de Referência Nacional em Vetores das Riquetsioses, LIRN-FIOCRUZ. Manguinhos, 21040-360, Rio de Janeiro, RJ, Brazil
* Corresponding author. E-mail: jonasgallao@usp.br

Abstract: New records of *Stenochrus portoricensis* Chamberlin, 1922 are given, the first south-american record in caves and the first to Goiás state in the Cerrado phytogeographical domain. Records of nine specimens (all females) in isolated regions from surface environment and deep zones in the cave suggest the status of troglophile (facultative cave-dwelling organisms) to this species. All specimens were found in places well preserved, without anthropization, differently from the observed to other records of the species in Brazil. Finally, we reinforce the need of replications on inventory studies of subterranean fauna.

Key words: subterranean arachnids, limestone caves, Goiás state, biodiversity

The order Schizomida Petrunkevic, 1945 comprises 46 genera and 274 species, distributed in two families: Protoschizomidae and Hubbardiidae. The most widespread and speciose family is Hubbardiidae, with 44 genera and 249 species (Harvey 2011). Among the so-called smaller arachnid orders, schizomids are the most diverse (Harvey 2007). These arachnids are distributed worldwide in tropical and subtropical regions (Tourinho and Kury 1999).

There are 13 species of schizomids recorded in Brazil, distributed in five genera mainly in Amazonian region (Armas 2010; Santos *et al.* 2013). *Stenochrus portoricensis* Chamberlin, 1922, is one of these species, originally described from Mexican and Caribbean regions and found in other countries, such as Nicaragua, USA, Bermuda, Dominican Republic, Colombia, Virgin Islands. However, this species has been recorded in other regions as well as in greenhouses in England, Czech Republic, Slovakia and Poland, where *S. portoricensis* is considered an exotic species (Christophoryová *et al.* 2013; Zawierucha *et al.* 2013). In Brazil, *S. portoricensis* can be found in anthropized places in São Paulo, Rio de Janeiro and Bahia states, close to Atlantic Forest fragments or in its boundaries, in humid habitats and also in urban areas (Tourinho and Kury 1999; Santos *et al.* 2008; Kury *et al.* 2010). For central Brazil, we have records at Tocantins state, and, in this case, many individuals were recorded in very anthropized places, typical urban area (Kury *et al.* 2010). Considering the occurrence in subterranean environments, *S. portoricensis* has been recorded in Cuba, Belize, Guatemala, Jamaica, Puerto Rico and Mexico (Reddell 1997). Our record represents the first one for caves in South America and the first one for Goiás state.

We recorded the species within the limits of Terra Ronca State Park (46°10′–46°30′S, 013°30′–013°50′W), in São Domingos county, Goiás state, central Brazil (Figure 1). The region lies in the Cerrado phytogeographical domain (the savannah-like vegetation) interspersed by fragments of dry vegetation (Caatinga). The climate is characterized by a tropical semi-humid with four to five dry months per year (Nimer 1989). São Domingos is a carbonate karst area with continuous limestone outcrops and huge cave systems, reaching 30 km of development (linear measurements). After three collecting occasions, we recorded *S. portoricensis* in a single cave from São Domingos karst, the Terra Ronca II cave, part of a huge cave system named Terra Ronca-Malhada (Figure 2). Terra Ronca II cave has more than 7 km of extension, crossed by a subterranean river and many bank rivers with available micro-habits for fauna establishment. Specimens were collected in the twilight (crepuscular light) and aphotic (permanent darkness) zones, in sectors isolated from the epigean (=superficial) environment. The collections were carried out in the beginning of the rainy season (October 2012). We found the specimens in humid bank rivers, under small rocks with soil composed by sand, silt and vegetal debris, in an extremely humid environment (relative air humidity > 80%). In total, nine individuals (all females) were collected through visual inspection and fixed in ethanol 70%.

Specimens were examined under stereoscope and verified in relation to the diagnosis of the species. Reference material was consulted. Illustrations (photography) were taken with a FujiFilm X10 attached to a Leica MZ16 stereoscope (Figure 3a and 3b) and Olympus BX40 microscope (Figure 3c).

Material examined: *Stenochrus portoricensis* Chamberlain, 1922. Brazil; Goias; Terra Ronca II cave, MNRJ 4270, 6♀; LES 4517, 3♀; *leg.* M. E. Bichuette, J. E. Gallão, under rocks.

Other examined material: Brazil; Rio de Janeiro; Praia Vermelha, MNRJ 7063, 4♀; MNRJ 7064, 1♀; MNRJ 7065, 4♀; MZUSP 11990, 4♀; *leg.* A. B. Kury by sifting leaf litter.

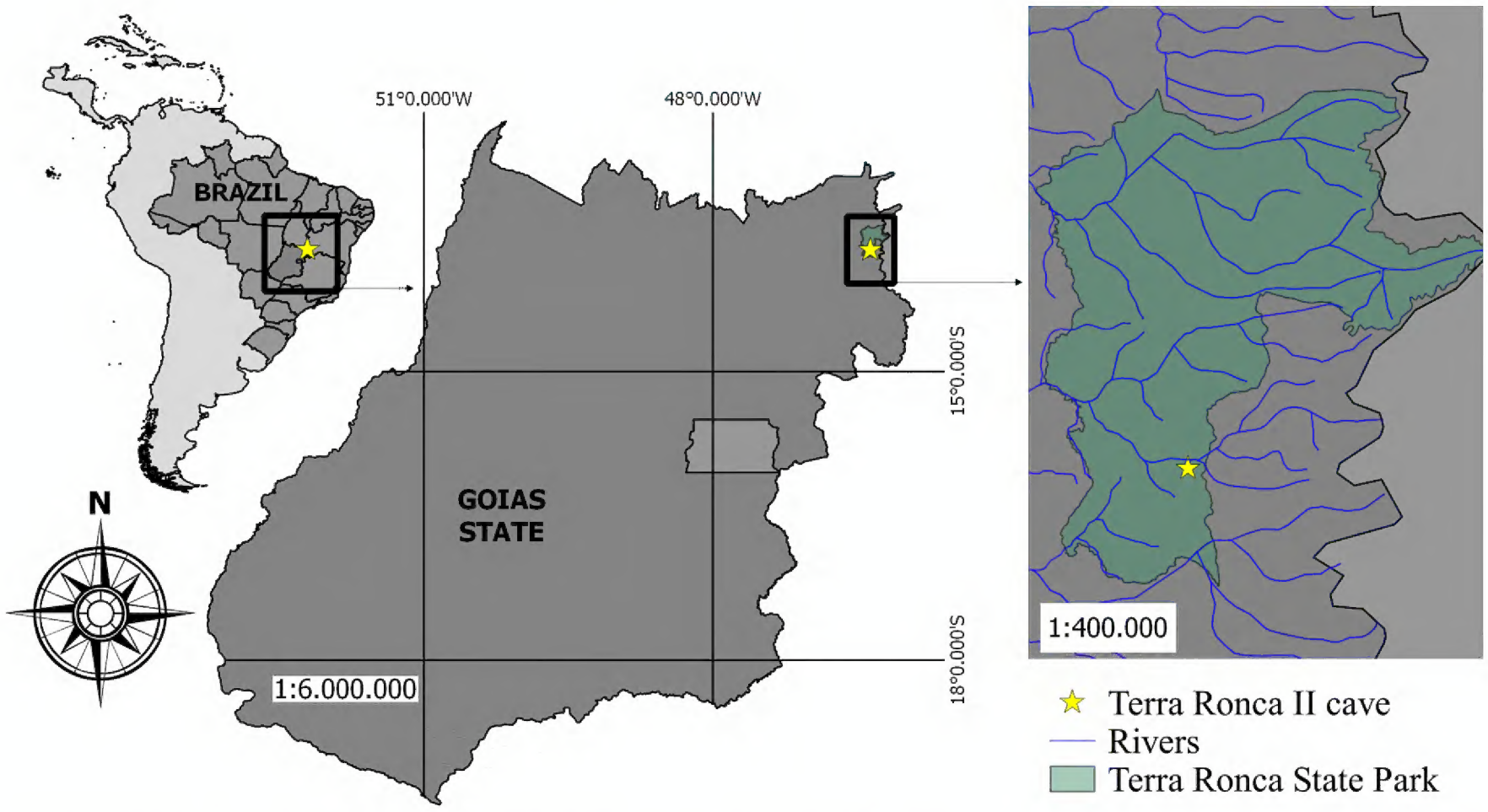

Figure 1. Location of Terra Ronca II cave, São Domingos karst area, central Brazil, new distribution of *Stenochrus portoricensis* Chamberlin, 1922. Yellow star indicates the Terra Ronca-Malhada cave system.

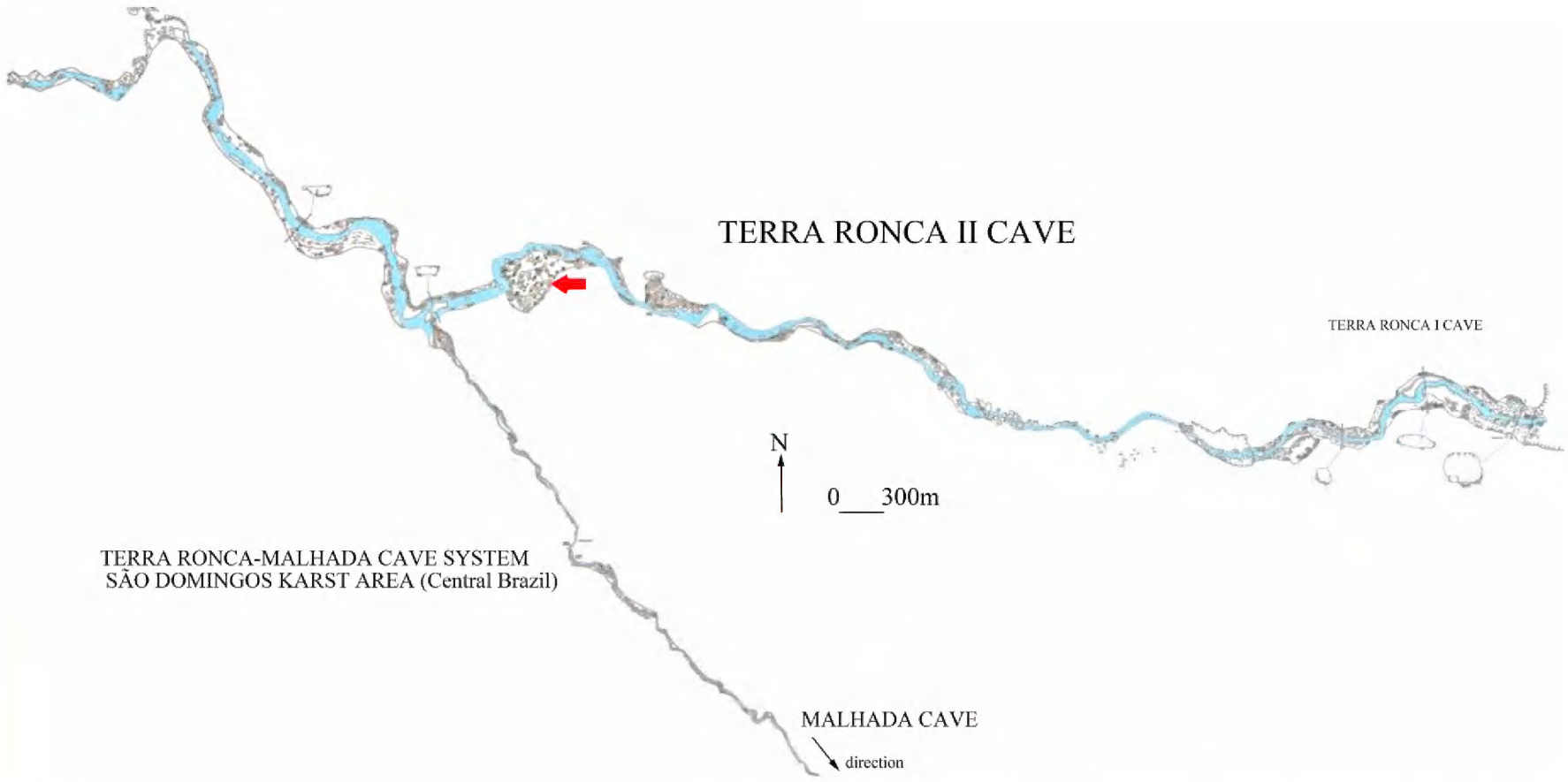

Figure 2. Map of Terra Ronca-Malhada cave system with Terra Ronca II cave. Red arrow indicates where the specimens were recorded. Map authority: Grupo Bambuí de Pesquisas Espeleológicas (GBPE).

22.952262°, −43.160867° alt. 2–15 m.

Standard abbreviations cited are: UFSCar (Universidade Federal de São Carlos); MNRJ (Museu Nacional, Rio de Janeiro); LES (Laboratório de Estudos Subterrâneos).

New record: This record represents the first one for Goiás state, Brazilian caves and occurrence in transitional vegetation (Cerrado–Caatinga transition). Considering the records in caves and epigean environment around the world, the large distance from the cave entrance and also the high abundance, *S. portoricensis* must be considered a troglophile, a facultative cave-dwelling, at least for the São Domingos karst area. Indeed, the specimens were recorded in a very preserved cave, without any apparent impact, such as deforesting or pollution of soil and watercourses and without touristic activity. This is the first occasion that this exotic species is recorded in such a preserved habitat, which suggests the need for more careful collections searching for these tiny arachnids. Indeed, we emphasize the necessity of more replications in the collections, since we recorded this population after the third occasion visiting the Terra Ronca II cave.

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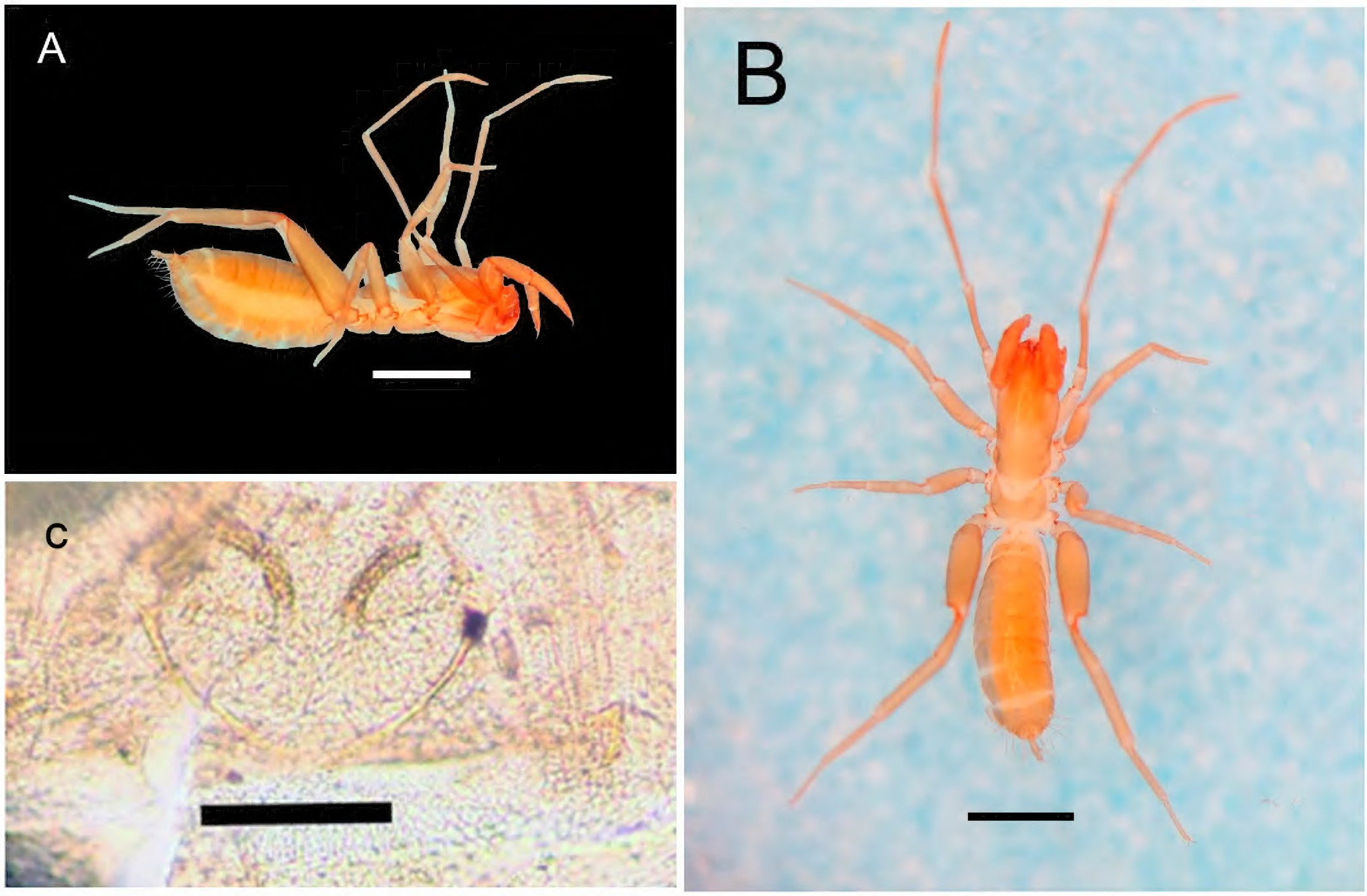

Figure 3. *Stenochrus portoricensis* Chamberlin, 1922 (MNRJ 4270, female). **A:** habitus, lateral view, scale bars: 0.5 mm. **B:** Habitus, dorsal view, scale bars: 0.5 mm. **C:** Spermatheca, scale bars: 0.02 mm.

2010/08459-4) and Conselho Nacional de Desenvolvimento Tecnológico (CNPq, process number 3037152011-1). All collections were made respecting state laws (permit for scientific research in protected area SEMARH #063/2012) and federal laws (SISBIO #28992-1). We also thank to PPGERN/UFSCar for the infrastructure to execute part of this work.

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